

Having described the invention, what is claimed is:

1. A sewage grinder pump comprising:
 - a motor housing having a discharge conduit monolithic therewith, the discharge conduit having an anti-siphon valve integral therewith;
 - a motor enclosed within the motor housing, the motor having a shaft extending vertically therefrom;
 - a pump housing attached to the motor housing, the pump housing including an inlet, an outlet and an inter-stage conduit, the outlet being in fluid communication with the discharge conduit;
 - a plurality of vortex impellers attached to the motor shaft, the plurality of vortex impellers positioned within the pump housing;
 - a grinder attached to the motor shaft, the grinder and the plurality of impellers having a common axis of rotation, the grinder positioned within the pump housing inlet; and
 - a discharge flange attached to the motor housing, the discharge flange having a fluid conduit therein, the fluid conduit being in fluid communication with the motor housing discharge conduit, the discharge flange having a check valve integral therewith and a connector assembly, the connector assembly adapted to connect the discharge flange to a sewage outlet, the connector assembly including an elastomeric seal for sealingly engaging the sewage outlet, the check valve being positioned within the fluid conduit.
2. The sewage grinder pump according to claim 1, wherein the motor housing includes a motor enclosure, the discharge conduit being external to the motor enclosure.
3. A method for grinding and pumping sewage comprising:
 - providing a motor of about 2 horsepower having a shaft extending therefrom with a first stage impeller, a second stage impeller and a grinder attached thereto, the second stage impeller being attached to the shaft proximate the motor, the first stage impeller being attached to the shaft proximate the second stage impeller and the grinder being attached to the shaft proximate the first stage impeller;
 - operating the motor to rotate the attached impellers and grinder to produce at least about 200 feet head at zero flow and at least about 30 gallons per minute maximum flow;
 - introducing sewage into the grinder;
 - grinding any solids contained in the sewage in the grinder;

passing sewage from the grinder into the first stage impeller;
increasing the pressure of the sewage by rotation of the first stage impeller;
passing sewage from the first stage impeller into the second stage impeller;
increasing the pressure of the sewage further by rotation of the second stage impeller;
discharging the pressurized sewage through a discharge conduit that is monolithic with a housing surrounding the motor and into a sewer system;
relieving vacuum within the discharge conduit through an anti-siphon valve that is integral with the discharge conduit; and
preventing backflow into the discharge conduit with a check valve that is integral with a discharge flange attached to the discharge conduit.

4. A sewage grinder pump comprising:
a housing;
a motor enclosed within the housing, the motor having a shaft extending therefrom;
a plurality of centrifugal impellers attached to the motor shaft; and
a grinder attached to the motor shaft, the grinder and the plurality of impellers having a common axis of rotation.
5. The sewage grinder pump according to claim 4, wherein the motor shaft extends vertically.
6. The sewage grinder pump according to claim 4, wherein the plurality of centrifugal impellers are positioned between the motor and the grinder.
7. The sewage grinder pump according to claim 4, wherein at least one of the plurality of centrifugal impellers is a vortex impeller.
8. The sewage grinder pump according to claim 4, wherein each centrifugal impeller is a vortex impeller.
9. The sewage grinder pump according to claim 4, wherein there are two centrifugal impellers, a first stage impeller and a second stage impeller, each impeller being a vortex impeller.

10. The sewage grinder pump according to claim 9, wherein the grinder further comprises a means for throttling inlet flow.
11. The sewage grinder pump according to claim 10, wherein the motor is about two horsepower.
12. The sewage grinder pump according to claim 11, wherein the sewage grinder pump has a stall head greater than about 200 feet and a maximum flow greater than about 30 gallons per minute.
13. The sewage grinder pump according to claim 9, further comprising a pump housing, the pump housing having an inlet, an inter-stage conduit connecting the discharge of the first stage impeller to the inlet of the second stage impeller, and an outlet connected to the discharge of the second stage impeller, the grinder being positioned within the inlet.
14. The sewage grinder pump according to claim 4, further comprising a discharge conduit monolithic with the motor housing.
15. The sewage grinder pump according to claim 14, wherein the discharge conduit has an anti-siphon integral therewith, the anti-siphon valve having a valve seat and a movable valve.
16. The sewage grinder pump according to claim 15, wherein the anti-siphon valve includes a means for bleeding fluid.
17. The sewage grinder pump according to claim 15, wherein the anti-siphon valve includes a stop, the stop being positioned between the movable valve and the interior of the discharge conduit.
18. The sewage grinder pump according to claim 15, wherein the movable valve lies in a plane that is inclined from vertical.
19. The sewage grinder pump according to claim 4, further comprising:

an integral discharge flange and check valve attached to the housing, the discharge flange in fluid communication with at least one of the centrifugal impellers.

20. The sewage grinder pump according to claim 19, wherein the discharge flange has a lift handle monolithic therewith.

21. A method for grinding and pumping sewage comprising:
providing a motor having a shaft extending therefrom with a first stage impeller, a second stage impeller and a grinder attached thereto;
operating the motor to rotate the attached impellers and grinder;
introducing sewage into the grinder;
grinding any solids contained in the sewage in the grinder;
passing sewage from the grinder into the first stage impeller;
increasing the pressure of the sewage by rotation of the first stage impeller;
passing sewage from the first stage impeller into the second stage impeller;
increasing the pressure of the sewage further by rotation of the second stage impeller; and
discharging the pressurized sewage into a sewer system.

22. The method according to claim 21, wherein the step of discharging the pressurized sewage comprises discharging the pressurized sewage through a discharge conduit that is monolithic with a housing surrounding the motor.

23. The method according to claim 22, further comprising relieving vacuum within the discharge conduit through an anti-siphon valve that is integral with the discharge conduit.

24. The method according to claim 22, wherein the step of discharging the pressurized sewage includes preventing back flow into the discharge conduit with a check valve that is integral with a discharge flange attached to the discharge conduit.

25. The method according to claim 21, wherein the step of providing a motor comprises providing a motor of about 2 horsepower and the step of operating the motor comprises rotating the motor and attached impellers to produce at least about 200 feet head at zero flow and at least about 30 gallons per minute maximum flow.

26. The method according to claim 21, wherein the step of providing a motor comprises attaching the second stage impeller to the shaft proximate the motor, attaching the first stage impeller to the shaft proximate the second stage impeller, and attaching the grinder to the shaft proximate the first stage impeller.
27. A sewage grinder pump comprising:
a housing;
a motor enclosed within the housing, the motor having a shaft extending therefrom;
a pump attached to the motor shaft; and
a grinder attached to the motor shaft,
the housing having a discharge conduit monolithic therewith, the discharge conduit being in fluid communication with the pump.
28. The sewage grinder pump according to claim 27, wherein the pump is a single stage pump.
29. The sewage grinder pump according to claim 27, wherein the pump is a two stage pump.
30. The sewage grinder pump according to claim 27, wherein the housing includes a motor enclosure, the discharge conduit being external to the motor enclosure.
31. A sewage grinder pump comprising:
a housing;
a motor enclosed within the housing, the motor having a shaft extending therefrom, the motor being about 2 horsepower;
two impellers attached to the motor shaft, a first stage impeller and a second stage impeller, the sewage grinder pump having a stall head greater than about 200 feet and a maximum flow greater than about 30 gallons per minute; and
a grinder attached to the motor shaft.
32. The sewage grinder pump according to claim 31, wherein the motor shaft extends vertically and the grinder and the two impellers have a common axis of rotation.

33. The sewage grinder pump according to claim 31, wherein each impeller is a vortex impeller.
34. The sewage grinder pump according to claim 33, wherein the grinder further comprises a means for throttling inlet flow.
35. The sewage grinder pump according to claim 31, further comprising a pump housing, the pump housing having an inlet, an inter-stage conduit connecting the discharge of the first stage impeller to the inlet of the second stage impeller, and an outlet connected to the discharge of the second stage impeller, the grinder being positioned within the inlet.
36. A sewage grinder pump comprising:
a housing;
a motor enclosed within the housing, the motor having a shaft extending therefrom;
a pump attached to the motor shaft;
a grinder attached to the motor shaft; and
a discharge flange in fluid communication with the pump, the discharge flange having a check valve integral therewith.
37. The sewage grinder pump according to claim 36, wherein the discharge flange is removably attached to the housing.
38. The sewage grinder pump according to claim 36, wherein the discharge flange has a fluid conduit therein, the fluid conduit has an inlet and an outlet, the check valve being positioned in the inlet.
39. The sewage grinder pump according to claim 38, wherein the check valve comprises:
a removable valve seat attached to the fluid conduit inlet; and
a movable valve attached to the valve seat.
40. A sewage grinder pump comprising:
a housing;

a motor enclosed within the housing, the motor having a shaft extending therefrom;
a pump operably attached to the motor shaft;
a grinder operably attached to the motor shaft; and
a discharge conduit in fluid communication with the pump, the discharge conduit having an anti-siphon valve integral therewith, the anti-siphon valve having a valve seat and a movable valve.

41. The sewage grinder pump according to claim 40, wherein the anti-siphon valve includes a means for bleeding fluid from the discharge conduit.

42. The sewage grinder pump according to claim 40, wherein the anti-siphon valve includes a stop, the stop being positioned between the movable valve and the interior of the discharge conduit.

43. The sewage grinder pump according to claim 40, wherein the movable valve lies in a plane that is inclined from vertical.

44. The sewage grinder pump according to claim 40, wherein the discharge conduit is monolithic with the motor housing.

45. A method of installing a sewage grinder pump in a basin, the basin having a sewage outlet connection, the method comprising:

- providing a sewage grinder pump;
- selecting an appropriate discharge flange from a plurality of discharge flanges comprising at least one discharge flange having a first configuration and at least one discharge flange having a second configuration;
- attaching the discharge flange to the sewage grinder pump;
- positioning the sewage grinder pump with the attached discharge flange within the basin;
- attaching the discharge flange to a sewage outlet connection.

46. The method according to claim 45, wherein the step of providing a sewage grinder pump includes providing a sewage grinder pump having a housing, the housing having a discharge conduit monolithic therewith; and

the step of attaching the discharge flange to the sewage grinder pump includes attaching the discharge flange to the housing discharge conduit.

47. A sewage grinder pump comprising:
a housing;
a motor enclosed within the housing, the motor having a shaft extending therefrom;
a pump operably attached to the motor shaft; and
a grinder operably attached to the motor shaft;
a discharge flange attached to the housing, the discharge flange being in fluid communication with the pump, the discharge flange having a connector assembly, the connector assembly adapted to connect the discharge flange to a sewage outlet, the connector assembly including an elastomeric seal for sealingly engaging the sewage outlet.
48. The sewage grinder pump according to claim 47, wherein the elastomeric seal has a conical shape.
49. The sewage grinder pump according to claim 47, wherein the connector assembly further comprises:
a flange having a central aperture, the central aperture being in fluid connection with the discharge conduit.
50. The sewage grinder pump according to claim 47, wherein at least a portion of the flange extends at about a right angle to an adjacent portion of the discharge conduit.
51. The sewage grinder pump according to claim 47, further comprising:
a retainer ring securing the elastomeric seal to the flange, a central portion of the elastomeric seal extending outwardly through the retainer ring.
52. In combination:
the sewage grinder pump according to claim 47; and
a basin, the basin including a sewage outlet and a connecting flange about the sewage outlet, the sewage grinder pump connector assembly slidable engaging the basin connecting flange and the sewage grinder pump elastomeric seal sealingly engaging the sewage outlet.

53. The combination according to claim 52, wherein the sewage grinder pump elastomeric seal has a conical shape and a central portion of the sewage grinder pump elastomeric seal engages the sewage outlet.